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# **Case Study: Sustainable Greener Military Chemical Products**

Mr. Raymond Paulson  
Fleet Readiness Center Southwest  
NAS North Island  
San Diego, CA  
raymond.paulson@navy.mi

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## ***Presentation Outline***

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- FRCSW North Island Background
- Drivers
- Sustainability and Greener
- Case Study Spray Lacquer
- Applicable Standards
- Reformulation Resources
- Summary

# ***Fleet Readiness Center Southwest NAS North Island***

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- **Navy Aircraft Maintenance & Repair (MRO)**
- **F/A-18 Hornet, E-2 Hawkeye, C-2 Greyhound, SH-60 Seahawk, AH-1 Super Cobra**
- **Shipboard Components**

# ***Fleet Readiness Center Southwest NAS North Island***

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- **71 buildings**
- **2.2 million square feet**
- **358 acres**
- **33,000 equipment items**
- **Over \$1.4 billion replacement value infrastructure and equipment**

# Drivers

## Federal Government Terminology Transition “Environmentally Preferable” to “Green” to “Sustainable”

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1993 Executive Order 12873

“‘Environmentally preferable’ means products or services that **have a lesser or reduced effect on human health and the environment** when compared with competing products or services that serve the same purpose.”

1995 EPA Environmentally Preferable Products — Proposed Guidelines

“seven (7) general guiding principles designed to... identifying and purchasing EPPs.”

1998 Executive Order 13101

EPPs re-defined (as above)

“‘Biobased’ means a commercial or industrial product (other than food or feed) that utilizes biological products or **renewable** domestic agricultural (plant, animal and marine) or forestry materials.”

2000 Executive Order 13148

Implement **environmental management systems** by 12/31/05

2004 Joint Group on Environmental Attributes — November Meeting Minutes

Change DLIS-maintained Web site from Environmentally Preferred Purchasing (EPP) to **Green** Procurement Program (GPP)

2004 DOD  
Green Procurement Program (GPP)

Framework selected: an environmental management system

2007 Executive Order 13423

“‘Sustainable’ means to create and maintain conditions, under which humans and nature can exist in productive harmony, that permit the social, economic, and other requirements of present and future generations of Americans”

# Drivers

## Executive Order 13423 Partial Summary Chemical Products/Processes

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### Goals

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#### d) acquired goods:

- i) use sustainable environmental practices  
biobased environmentally preferable  
recycled-content energy and water  
efficient

#### e) agencies:

- i) ↓ toxic materials acquired used disposed
- ii) waste prevention & recycling programs

### Sustainable Practices

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- i) reduced greenhouse gases, ↓ energy
- ii) renewable energy
- iii) water conservations
- iv) acquisition
- v) pollution & waste prevention, recycling
- vi) ↓ toxic chemical acquisition & use

**“ . . . create and maintain conditions, under which humans and nature can exist in productive harmony, that permit the social, economic, and other requirements of present and future generations of Americans”**

# ***Drivers***

## **Executive Order 13514 Partial Summary Chemical Products/Processes**

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- EO 13423 replaced all prior executive orders
- EO 13514 latest executive order
  - Utilizes EO 13423 and adds requirements
    - PERFORMANCE GOALS
      - Green House Gases
      - Fossil Fuel Reduction Goals
      - Sustainability Goals (e.g. environmental, energy, etc)
- Both EO's
  - LCA
  - Green Procurement



# Drivers

## EPA Defined Environmental Performance Characteristics

### 1. Materials Hazard Factors

- Human  
Acute/Chronic, Immunologic, Neurotoxin  
Carcinogenic, Sensitizer Irritant, Reproductive
- Ecologic  
Aquatic, Avian, Terrestrial Species
- Product  
Corrosivity, Flammability, Reactivity

### 2. Human Health and Ecological Stressors

- Bioaccumulative
- Ozone Depleting
- TRI, Air Pollutants and GHGs

### 3. Positive Attributes

- Recyclability
- Reusability
- Durability

### 4. Natural Resources Use

- Ecosystem Impacts
- Energy, Water and Resource Consumption
- Renewable, Non Renewable and Rapidly Renewable

**Environmentally  
Preferable  
Products  
(EPPS)**

Lifecycle Stages

# ***Drivers***

## ***DLA Chaired Joint Group on Environmental Attributes***

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- Bio-Based
- CA Air Quality Compliant
- Comprehensive Procurement Guideline (CPG) Compliant (EPA)
- Energy Star Complaint
- Environmentally Friendly
- EPEAT (Electronic) Environmental Criteria (51)
- Environmental Technology Verification
- Federal Energy Management Program (EMP) Efficient
- Green Seal of Approval
- National Emissions Standards for HAPs Compliant
- Non-Toxic Item
- PRIME Item
- Recycled Content
- Significant New Alternatives Program (S.N.A.P.) Approved (EPA)

# ***Drivers***

## ***GSA Criteria***

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- **Asbestos Alternative Products**  
*Washers, Gaskets, Clamps, Insulators*
- **Energy Efficient Products (FEMP)**  
*Lighting, Food Equipment, Industrial Equipment, Residential Equipment, Plumbing*
- **Low Standby Power Products (FEMP)**  
*Audio/Video, Office, Major Appliances*
- **Energy Star Products (FEMP)**  
*Equipment, HVAC, Electronics, Office, Lighting, Food*
- **Low VOC Products**  
*Paints, Solvents, Coatings, Inks*
- **EPA Comprehensive Procurement Guideline (CPG)**
  - Guidance Information
- **Recycled Content Guidelines**  
*Construction, Landscaping, Office (nonpaper), Paper, Transportation*
- **EPA Water Conserving Products**  
*Plumbing*
- **EPEAT (Electronic Products)**
  - Electronic Products

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**IS ANYONE CONFORMING TO  
EO 13514 FOR GREEN  
PROCUREMENT?**

**STANDARDS?  
INFORMATION?  
LABELS?**

**CASE STUDY REQUIRED!**

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# WHAT IS A SUSTAINABLE AND GREEN PURCHASE FOR A CHEMICAL PRODUCT PER EO 13514?

CASE STUDY - "EIGHT SPRAY  
LACQUER USED  
BY THE US NAVY"

# ***Chemical Product Sustainability***

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- Environment Footprint Information
  - Information typically missing
- Economic Footprint Information
  - Life cycle cost accounting
- Quality of Life Footprint Information
  - MIL-SPEC / Warrantee and or Design Life
  - Worker Safety and Rights
  - Fair Trade, Fair Labor

## ***Chemical Product Sustainability, cont.***

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- Environmental Footprint
  - Life Cycle Assessment Footprint
    - Resource Footprint
      - Sustainable Resources
    - Regulated Waste Chemical Footprint
    - Green House Gases Footprint
  - In-product Greener Chemicals

## ***Chemical Product Sustainability, cont.***

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- Environmental Footprint, cont.
  - Resource Footprint
    - Material Footprint
    - Water Footprint
    - Energy Footprint
  - Percent Sustainable
    - Renewable Resources



## ***Chemical Product Sustainability, cont.***

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- Regulated Waste Chemicals Footprint
  - Solid Waste Footprint (containerized)
  - Petroleum Waste Footprint
  - Industrial Waste Footprint (wastewater)
  - Air Pollution Waste Footprint
    - Criteria air pollution footprint
    - Hazardous air pollution footprint

## ***Chemical Product Sustainability, cont.***

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- Green House Gas Footprint
  - Carbon Dioxide Equivalent Footprint
  - CO<sub>2</sub>(e)
    - CO<sub>2</sub>
    - Nitrous Oxides
    - Methane
    - Refrigerants

## ***Chemical Product Greener***

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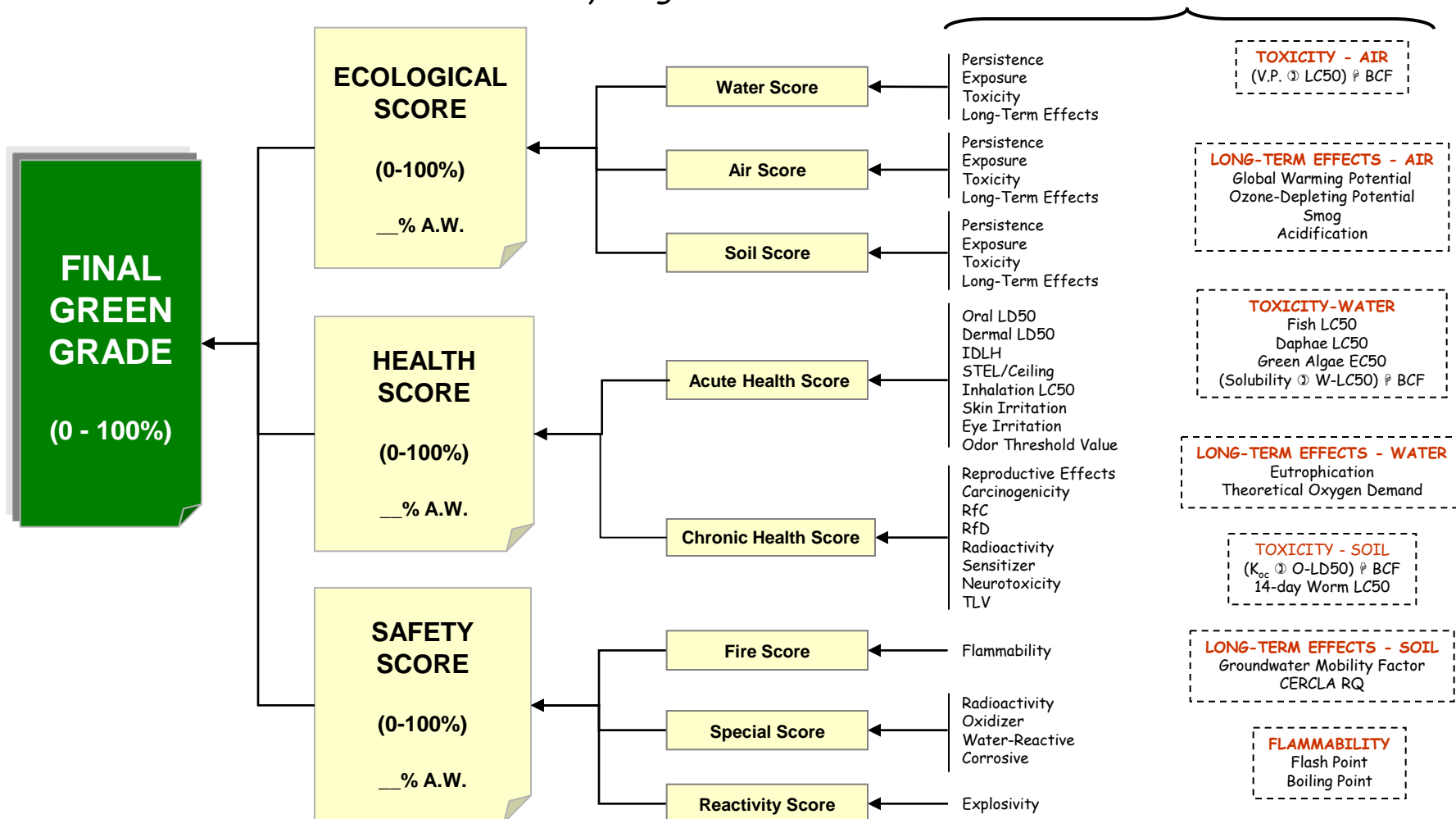
- Product Greener Chemical Content
  - Greener Means Less Hazardous
- Greener Chemical Categories
  - Human Health
  - Physical Safety
  - Ecological Impact

# Chemical Compliance System

## Green Scoring

*Significance of each sub-score can be individually weighted*

*"Endpoint" Criteria*



# ***NSN: 8010005152487 (SPRAY LACQUER)***

PRODUCT		MSDS		GREEN GRADE (0–100%)
MANUFACTURER	NAME	# CHEMs	TOTAL %	
Pacific Aerosol	Lacquer	5	86.0	79
Sherwin Williams	1951 Clear Lacquer Aerosol	7	87.0	79
Sprayon Products	01951 Clear LAC	7	85.0	79
Illinois BP&P Co.	Lacquer TT-L-50G	3	84.3	79
LHB Industries	Clear (14-100)	6	91.8	77
Borden Inc.	Krylon Spray #1303	6	110.0	76
Seymour of Sycamore Inc.	Clear	11	90.0	76
LHB Industries	Aerosol 14B100 (G/O) Clear Lacquer	8	101.0	75
Borden Inc.	Krylon 1303 (Old Form)	5	94.0	75

## ***Greener Chemical Product, cont***

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- Greener Chemical Categories
- Sustainable Materials
  - Renewable Materials
    - Bio-based Content (non-fossil)
- Re-utilized Content
  - Recovered Resource
  - Recycled
- Raw Sustainable Content
  - No net negative environmental impact
    - E.g. sustainable forest products, agriculture, mining etc

## ***Sustainable and Greener Chemical Product, cont.***

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*“Where is the information?”*

- Standards
  - USA
    - Year 2011 ANSI Greener Chemicals and Process Information Standard
      - <http://www.nsf.org/> National Sanitation Foundation
      - ACS Green Chemistry Institute
    - Other standards
- Data Sheet
  - Similar to LEED Report Card for Buildings
  - DOD, Navy, Industry May Request Information per ANSI Standard

## ***Sustainable and Greener Chemical Product, cont.***

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### ***“Reformulation Resources”***

- EPA Design for the Environment (DfE)
  - Program to reformulate Chemical Products
- Program Name - CLEAN-gredients
  - Reformulate Products for Vendors and DOD
  - Sustain MIL-SPEC



## *Summary*

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- Sustainability and Green Chemical Product Evaluation
- ISO 13514 and 13423 Requires the Following
  - LCA Information
  - Sustainable Resource Information
  - Greener Chemical Information

## ***Summary, cont.***

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- ANSI Greener Chemicals and Information Standard Addresses the Required Information
- The Standard Provides the Information and Label
  - May request information similar to LEED
- Reformulation Resources
  - EPA DfE
  - Clean-Gradients